

## CLAIMS

### WHAT IS CLAIMED IS:

1. A method of transmitting data across a telecommunication network, the method comprising:

5 partitioning a data stream into a plurality sub-streams;  
transmitting a sub-stream across an assigned circuit  
switching channel in one communication session; and  
reconstructing the plurality of sub-streams into a single  
data stream.

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2. The method of claim 1 wherein the sub-streams from the  
partitioning of the data stream is represented by a  
packetization format.

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3. The method of claim 1 wherein one communication session  
denotes a time-sensitive communication event.

4. The method of claim 1 wherein one communication session  
denotes an interactive communication event

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5. The method of claim 1 wherein one communication session  
denotes any communication purpose served with a set of procedures  
in real-time or non-real time.

6. The method of claim 1 wherein one communication session denotes any communication purpose with various combinations of different types of procedures.

5 7. The method of claim 1 wherein the partitioning the data stream comprises:

partitioning the data stream based upon a characteristic of the data stream.

10 8. The method of claim 7 wherein the characteristic of the data stream is selected from at least one of priority, sources of the data stream, defined objects, defined areas, rate of motion change, data stream importance, and security level of data stream.

15 9. The method of claim 1 wherein the circuit switching channels include wired links.

20 10. The method of claim 1 wherein the circuit switching channels include wireless links.

11. The method of claim 1 wherein the partitioned data stream are transmitted across circuit switching channels that are bundled.

12. The method of claim 1, further comprising:

transmitting a lower priority portion of the data stream  
across a packet switching channel.

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13. The method of claim 1, further comprising:

transmitting a non-interactive portion of the data stream  
across a broadcast channel.

10 14. The method of claim 13 wherein the broadcast channel  
includes at least one of a broadcast television channel, a  
broadcast radio channel, a cable television channel, a pager  
channel or another type of channel.

15 15. The method of claim 1 wherein the data stream includes  
multi-media content.

16. The method of claim 15 wherein the multi-media content  
includes at least one of video, audio, computer-generated  
20 objects, and text.

17. The method of claim 15 wherein the multi-media content  
includes an interactive characteristic.

18. The method of claim 15 wherein the multi-media content includes non-interactive characteristic.

19. The method of claim 1 wherein the partitioned data stream  
5 is based upon an object oriented multi-media standard.

20. The method of claim 19 wherein the object oriented multi-media standard is based upon one of MPEG 4, MPEG 7, or MPEG 21.

21. The method of claim 1 wherein a circuit switching channel is selected to transmit a particular sub-stream based on at least one of the characteristic of the sub-stream, the quality of the channel, and the availability of the channel.

22. The method of claim 1 wherein the reconstructing the plurality of sub-streams includes performing error compensation to minimize error effect in the reconstructed data stream.

23. The method of claim 1 wherein the data stream is related to time-sensitive video streaming.

24. The method of claim 23 wherein the time-sensitive video streaming includes an interactive characteristic.

25. The method of claim 23 wherein the time-sensitive video streaming has a bit rate below 1 Mbps.

5 26. The method of claim 1 wherein the data stream includes video.

27. The method of claim 26, further comprising:  
performing compression on the video.

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28. The method of claim 27 wherein the compression is based upon one of H.261, H.263, MPEG-1, MPEG-2, or MPEG-4.

29. The method of claim 27, wherein the video is used for one  
15 of video conferencing, surveillance, or live event broadcasting applications.

30. The method of claim 1 wherein the data stream includes audio.

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31. The method of claim 30, further comprising:  
performing compression on the audio.

32. The method of claim 31 wherein the compression is based

upon one of a speech compression technique or a stereo sound compression technique.

33. The method of claim 31, wherein the audio is used for one  
5 of video conferencing, surveillance, or live event broadcasting applications.

34. The method of claim 12 wherein the lower priority portion  
10 of the data stream is transmitted as packets across a packet switching channel.

35. The method of claim 34 wherein the packet is based on one of various protocols.

15 36. An article of manufacture, comprising:

a machine-readable medium having stored thereon  
instructions to:

partition a data stream into a plurality sub-streams;  
transmit each sub-stream across an associated circuit  
20 switching channel in one communication session; and  
reconstruct the plurality of sub-streams into a single  
data stream.

37. A method of transmitting secured information across a

network, the method comprising:

transmitting a security key from a source to a destination  
along at least one circuit switching channel; and

transmitting encrypted data packets from the source to the  
5 destination along at least one packet switching channel, the  
security key capable to decrypt the encrypted data packets.

38. A method of re-synchronizing information across a network,  
the method comprising:

10 transmitting a synchronization flag from a source to a  
destination along at least one circuit switching channel; and

transmitting data packets from the source to the destination  
along at least one packet switching channel, the synchronization  
flag capable to re-construct video content from sub-streams  
15 collected from a de-bundler stage.

39. A method of performing at least one of the following  
activities, such as security monitoring, video conference, or  
live event broadcasting, the method comprising:

20 in response to an event, locally capturing video or audio  
data associated with a scene;

transmitting the video or audio data along a plurality  
of circuit switching channels; and

selectively transmitting the video or audio data along

a plurality of packet switching channels.

40. The method of claim 39, further comprising:

storing the locally captured video or audio data in a  
5 storage device for subsequent transmission to a remote site.

41. The method of claim 40 wherein the storage device is a  
local hard disk

10 42. The method of claim 40 wherein the storage device is a  
mass storage device.

43. The method of claim 39 wherein the video or audio data  
is transmitted through a virtual broadband channel.

15 44. The method of claim 39, further comprising:

partitioning the video or audio data into sub-streams  
prior to transmitting the video or audio data along the circuit  
switching channels or the packet switching channels.

20 45. The method of claim 44, further comprising:

transmitting each sub-stream across an associated  
circuit switching channel or an associated packet switching  
channel.



46. The method of claim 44, further comprising:  
reconstructing the plurality of sub-streams into a single  
data stream.

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47. A method of performing multiple-way communication,  
comprising:

using a first agent to send or receive communication  
10 content along a virtual broadband network; and

using a second agent to send communication content to the  
first agent or receive communication content from the first agent  
by transmission of the communication content along the virtual  
broadband network;

15 wherein the virtual broadband network includes a  
plurality of virtual broadband channels, each virtual broadband  
channel comprising a plurality of circuit switching channels  
and a plurality of optional packet switching channels capable  
to transmit sub-streams of the communication content.

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48. A method of obtaining content from multiple sites,  
comprising:

using a first agent to capture content from a first  
location and to send the content along a virtual broadband

network; and

using a second agent to capture content from a second location and to send the content along the virtual broadband network;

5 using a third agent to process the content transmitted along the virtual broadband network and output the content at a third location;

wherein the virtual broadband network includes a plurality of virtual broadband channels, each virtual broadband  
10 channel comprising a plurality of circuit switching channels and a plurality of optional packet switching channels capable to transmit sub-streams of the content.

49. The method of claim 48 wherein the content from the first  
15 location and the second location are live events, and wherein the live events are shown concurrently by the third agent.

50. The method of claim 48 wherein the content from the first location is a live event, wherein the content from the second  
20 location is a static event, and wherein the third agent can concurrently show the live event and static event.

51. A method of implementing a reliable router with guaranteed quality of service, the method comprising:

employing a packet switched channel and multiple circuit switching channels in an otherwise packet switching data network;

when the router experiences congestion in the packet switching channel, sending high priority packets through the circuit switching channels directly to at least one destination.

52. The method of claim 51 wherein the high priority packets hyper-jumps through the circuit switching channels.

53. The method of claim 51 wherein the destination includes another router.

54. The method of claim 51 wherein the destination is in a less congested area.

55. An apparatus for transmitting data from a source to a destination, the system comprising:

a channel bundler and de-bundler capable to partition a data stream into a plurality of sub-streams, the data stream transmitted from the source, the channel bundler and de-bundler capable to reconstruct the sub-streams into a single data stream for transmission to the destination; and

a plurality of circuit switching channels communicatively

coupled to the channel bundler and de-bundler and capable to transmit an assigned sub-stream.

56. The apparatus of claim 55, further comprising:

5 a plurality of packet switching channels communicatively coupled to the channel bundler and de-bundler and capable to transmit a sub-stream from the data stream, the sub-stream having a lower priority characteristic.

10 57. The apparatus of claim 55 wherein the sub-stream is represented by a packetization format.

58. The apparatus of claim 55 wherein the data stream is transmitted as sub-streams in one communication session.

15 59. The apparatus of claim 58 wherein one communication session denotes a time-sensitive communication event.

60. The apparatus of claim 58 wherein one communication  
20 session denotes an interactive communication event.

61. The apparatus of claim 58 wherein one communication session denotes any communication purpose served with a set of procedures in real-time or non-real time.

62. The apparatus of claim 58 wherein one communication session denotes any communication purpose with various combinations of different types of procedures.

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63. The apparatus of claim 55 wherein the data stream is partition based upon a characteristic of the data stream.

64. The apparatus of claim 63 wherein the characteristic of the data stream is selected from at least one of priority, sources of the data stream, defined objects, defined areas, rate of motion change, data stream importance, and data stream security level.

65. The apparatus of claim 55 wherein the circuit switching channels include wired links.

66. The apparatus of claim 55 wherein the circuit switching channels include wireless links.

67. The apparatus of claim 55 wherein the partitioned data stream are transmitted across circuit switching channels that are bundled.

68. The apparatus of claim 55, further comprising:

a packet switching channel communicatively coupled to the partitioning stage and capable to transmit a lower priority portion of the data stream.

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69. The apparatus of claim 55, further comprising:

a broadcast channel communicatively coupled to the partitioning stage and capable to transmit a portion of the data stream.

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70. The apparatus of claim 69 wherein the broadcast channel comprises one of a broadcast television channel, a broadcast radio channel, a cable television channel, a pager channel, or another type of channel.

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71. The apparatus of claim 55 wherein the data stream includes multi-media content.

72. The apparatus of claim 71 wherein the multi-media content includes at least one of video, audio, computer-generated objects, and text.

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73. The apparatus of claim 71 wherein the multi-media content includes an interactive characteristic.

74. The apparatus of claim 71 wherein the multi-media content includes non-interactive characteristic.

5 75. The apparatus of claim 55 wherein the data stream is partitioned based upon an object oriented multi-media standard.

76. The apparatus of claim 75 wherein the object oriented multi-media standard is based upon one of MPEG 4, MPEG 7, or  
10 MPEG 21.

77. The apparatus of claim 55 wherein a circuit switching channel is selected to transmit a particular sub-stream based on at least one of the characteristic of the sub-stream, the  
15 quality of the channel, and the availability of the channel.

78. The apparatus of claim 55 wherein the reconstructing the plurality of sub-streams includes performing error compensation to minimize error effect in the reconstructed data stream.

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79. The apparatus of claim 55 wherein the data stream is related to time-sensitive video streaming.

80. The apparatus of claim 79 wherein the time-sensitive

video streaming includes an interactive characteristic.

81. The apparatus of claim 79 wherein the time-sensitive video streaming has a bit rate below 1 Mbps.

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82. The apparatus of claim 55 wherein the data stream includes video.

83. The apparatus of claim 82, further comprising:

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performing compression on the video.

84. The apparatus of claim 83 wherein the compression is based upon one of H.261, H.263, MPEG-1, MPEG-2, or MPEG-4.

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85. The apparatus of claim 83, wherein the video is used for one of video conferencing, surveillance, or live event applications.

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86. The apparatus of claim 55 wherein the data stream includes audio.

87. The apparatus of claim 86, further comprising:

performing compression on the audio.



88. The apparatus of claim 86 wherein the compression is based upon one of a speech compression technique or a stereo sound compression technique.

5 89. The apparatus of claim 86, wherein the audio is used for one of video conferencing, surveillance, or live event broadcasting applications.

10 90. The apparatus of claim 68 wherein the lower priority portion of the data stream is transmitted as a packet across a packet switching channel.

15 91. The apparatus of claim 90 wherein the packet is based on one of various protocols.

92. A communication system for transmitting and receiving data information from a source to a destination, the system comprising:

a recording system;

20 an alarm system communicatively coupled to the recording system; and

a virtual broadband system capable to transmit information captured by the recording system;

wherein important video data in the captured

information is transmitted over a plurality of bundled circuit switching channels in the virtual broadband system in response to a triggering by the alarm system;

5 93. The communication system of claim 92 a command or request is sent to the recording site from the destination via the circuit switching channels; and

wherein high resolution data is then sent over a packet switching network at a delayed time.

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94. The communication system of claim 93, further comprising:  
a storage device communicatively coupled to the virtual broadband system and capable to store the high resolution data.

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95. A communication system comprising:

an input device capable to capture video or audio data associated with a scene;

a plurality of circuit switching channels coupled to the input device and capable to transmit the captured video or audio

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data; and

a plurality of packet switching channels coupled to the input device and capable to selectively transmit the captured video or audio data.

96. The communication system of claim 95 wherein the captured video or audio data are transmitted as sub-streams.

97. The communication system of claim 95 wherein sub-streams  
5 with higher priority are transmitted along the plurality of circuit switching channels.

98. The communication system of claim 95 wherein sub-streams with lower priority are transmitted along the plurality of packet  
10 switching channels.

99. The communication system of claim 95, further comprising:  
a local storage device communicatively coupled to the  
input device and capable to store the data streams captured  
15 by the input device.

100. The communication system of claim 95, further comprising:  
a reconstruction stage coupled to the circuit switching  
channels and packet switching channels and capable to  
20 reconstruct the video and audio data from received sub-streams.

101. An apparatus for transmitting data across a telecommunication network, comprising:  
a partitioning stage capable to partition a data stream

into a plurality sub-streams;

a plurality of circuit switching channels  
communicatively coupled to the partitioning stage, with each  
circuit switching channel capable to transmit a selected

5 sub-stream in one communication session; and

a reconstruction stage communicatively coupled to the  
plurality of circuit switching channels and capable to  
reconstruct the plurality of sub-streams into a single data  
stream.

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102. The apparatus of claim 101, further comprising:

a plurality of packet switching channels communicatively  
coupled to the partitioning stage and capable to transmit a  
sub-stream from the data stream, the sub-stream having a lower  
15 priority characteristic.

103. The apparatus of claim 101 wherein the sub-stream is  
represented by a packetization format.

20 104. The apparatus of claim 101 wherein the data stream is  
transmitted as sub-streams in one communication session.

105. The apparatus of claim 104 wherein one communication  
session denotes a time-sensitive communication event.

106. The apparatus of claim 104 wherein one communication session denotes an interactive communication event.

5 107. The apparatus of claim 104 wherein one communication session denotes any communication purpose served with a set of procedures in real-time or non-real time.

10 108. The apparatus of claim 104 wherein one communication session denotes any communication purpose with various combinations of different types of procedures.

109. The apparatus of claim 101 wherein the data stream is partition based upon a characteristic of the data stream.

15 110. The apparatus of claim 109 wherein the characteristic of the data stream is selected from at least one of priority, sources of the data stream, defined objects, defined areas, rate of motion change, data stream importance, and data stream security  
20 level.

111. The apparatus of claim 101 wherein the circuit switching channels include wired links.

112. The apparatus of claim 101 wherein the circuit switching channels include wireless links.

113. The apparatus of claim 101 wherein the partitioned data stream are transmitted across circuit switching channels that are bundled.

114. The apparatus of claim 101, further comprising:

a packet switching channel communicatively coupled to the partitioning stage and capable to transmit a lower priority portion of the data stream.

115. The apparatus of claim 101, further comprising:

a broadcast channel communicatively coupled to the partitioning stage and capable to transmit a portion of the data stream.

116. The apparatus of claim 115 wherein the broadcast channel comprises one of a broadcast television channel, a broadcast radio channel, a cable television channel, a pager channel, or another type of channel.

117. The apparatus of claim 101 wherein the data stream includes multi-media content.

118. The apparatus of claim 117 wherein the multi-media content includes at least one of video, audio, computer-generated objects, and text.

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119. The apparatus of claim 117 wherein the multi-media content includes an interactive characteristic.

120. The apparatus of claim 117 wherein the multi-media content includes non-interactive characteristic.

121. The apparatus of claim 101 wherein the data stream is partitioned based upon an object oriented multi-media standard.

122. The apparatus of claim 121 wherein the object oriented multi-media standard is based upon one of MPEG 4, MPEG 7, or MPEG 21.

123. The apparatus of claim 101 wherein a circuit switching channel is selected to transmit a particular sub-stream based on at least one of the characteristic of the sub-stream, the quality of the channel, and the availability of the channel.

124. The apparatus of claim 101 wherein the reconstructing the

plurality of sub-streams includes performing error compensation to minimize error effect in the reconstructed data stream.

125. The apparatus of claim 101 wherein the data stream is  
5 related to time-sensitive video streaming.

126. The apparatus of claim 125 wherein the time-sensitive video streaming includes an interactive characteristic.

10 127. The apparatus of claim 125 wherein the time-sensitive video streaming has a bit rate below 1 Mbps.

128. The apparatus of claim 101 wherein the data stream includes video.

15 129. The apparatus of claim 128, further comprising:  
performing compression on the video.

130. The apparatus of claim 129 wherein the compression is  
20 based upon one of H.261, H.263, MPEG-1, MPEG-2, or MPEG-4.

131. The apparatus of claim 128, wherein the video is used for one of video conferencing, surveillance, or live event applications.



132. The apparatus of claim 101 wherein the data stream includes audio.

5 133. The apparatus of claim 132, further comprising:  
performing compression on the audio.

134. The apparatus of claim 133 wherein the compression is  
10 based upon one of a speech compression technique or a stereo  
sound compression technique.

135. The apparatus of claim 132, wherein the audio is used for  
one of video conferencing, surveillance, or live event  
15 broadcasting applications.

136. The apparatus of claim 114 wherein the lower priority  
portion of the data stream is transmitted as a packet across  
a packet switching channel.

20 137. The apparatus of claim 136 wherein the packet is based  
on one of various protocols.

138. An apparatus for transmitting secured information across  
a network, comprising:



transmitting the video data.

141. The apparatus of claim 140, further comprising:

5 a partitioning stage communicatively coupled to the first stage and capable to partition the video data into sub-streams prior to transmitting at least a portion of the video data along the circuit switching channels.

10 142. The apparatus of claim 141, wherein a higher priority sub-stream is transmitted across an associated circuit switching channel.

143. The apparatus of claim 140, further comprising:

15 a reconstruction stage communicatively coupled to the circuit switching channels and capable to reconstruct the plurality of sub-streams into a single data stream.

20 144. The apparatus of claim 140 wherein a sub-stream with a lower priority is transmitted along one of the packet switching channels.

145. The apparatus of claim 140, further comprising:

a storage device communicatively coupled to the first stage and capable to store the video data captured by the first

stage.

146. An apparatus for performing multiple-way communication, comprising:

5 a virtual broadband network;

a first agent communicatively coupled to the virtual broadband network and capable to send or receive communication content along a virtual broadband network; and

10 a second agent communicatively coupled to the virtual broadband network and capable to send communication content to the first agent or receive communication content from the first agent by transmission of the communication content along the virtual broadband network;

15 wherein the virtual broadband network includes a plurality of virtual broadband channels, each virtual broadband channel comprising a plurality of circuit switching channels capable to transmit sub-streams of the communication content.

147. An apparatus for obtaining content from multiple sites, comprising:

a virtual broadband network;

a first agent communicatively coupled to the virtual broadband network and capable to capture content from a first location and to send the content along a virtual broadband

network;

a second agent communicatively coupled to the virtual broadband network and capable to capture content from a second location and to send the content along the virtual broadband  
5 network; and

a third agent communicatively coupled to the virtual broadband network and capable to process the content transmitted along the virtual broadband network and output the content at a third location;

10 wherein the virtual broadband network includes a plurality of virtual broadband channels, each virtual broadband channel comprising a plurality of circuit switching channels capable to transmit sub-streams of the content.

15 148. The apparatus of claim 147 wherein the content from the first location and the second location are live events, and wherein the live events are shown concurrently by the third agent.

20 149. The apparatus of claim 147 wherein the content from the first location is a live event, wherein the content from the second location is a static event, and wherein the third agent can concurrently show the live event and static event.

150. A method of transmitting data across a telecommunication network, the method comprising:

partitioning a data stream into a plurality sub-streams;

transmitting a sub-stream across an assigned circuit

5 switching channel; and

reconstructing the plurality of sub-streams into a single data stream.

151. The method of claim 148, further comprising:

10 transmitting lower priority sub-stream across an assigned packet switching channel.

152. A router with guaranteed quality of service, the router comprising:

15 a packet switched channel;

communicatively coupled to the packet switched channel, multiple circuit switching channels in an otherwise packet switching data network;

20 wherein when the router experiences congestion in the packet switching channel, high priority packets are transmitted through the circuit switching channels directly to at least one destination.

153. The router of claim 152 wherein the high priority packets

hyper-jumps through the circuit switching channels.

154. The router of claim 152 wherein the destination includes another router.

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155. The router of claim 152 wherein the destination is in a less congested area.

156. An apparatus for transmitting data across a  
10 telecommunication network, the apparatus comprising:

means for partitioning a data stream into a plurality  
sub-streams;

coupled to the partitioning means, means for transmitting  
a sub-stream across an assigned circuit switching channel; and

15 coupled to the transmitting means, means for  
reconstructing the plurality of sub-streams into a single data  
stream.

157. The apparatus of claim 156, further comprising:

20 coupled to the partitioning means, means for transmitting  
lower priority sub-stream across an assigned packet switching  
channel.